

## WHAT IS CLAIMED IS:

1. An isolated antibody or fragment thereof that binds immunologically to *Bacillus anthracis* protective antigen with an affinity  $K_d$  of between about 140 pM and about 21 pM as determined by surface plasmon resonance.
2. The isolated antibody or fragment thereof of claim 1, further defined as binding immunologically to *Bacillus anthracis* protective antigen with a binding affinity  $K_d$  of between about 96 pM and about 21 pM.
3. The isolated antibody or fragment thereof of claim 1, further defined as binding immunologically to *Bacillus anthracis* protective antigen with a binding affinity  $K_d$  of between about 35 pM and about 21 pM.
4. The isolated antibody or fragment thereof of claim 1, further defined as a scAb, Fab or SFv.
5. The isolated antibody or fragment thereof of claim 1, further defined as comprising an Fc domain of IgA, IgD, IgE, IgG or IgM.
6. The isolated antibody or fragment thereof of claim 1, further defined as a humanized antibody.
7. The isolated antibody or fragment thereof of claim 1, wherein the antibody is human.
8. The isolated antibody or fragment thereof of claim 1, comprising an scFv fragment and antibody constant regions forming a monovalent antibody portion of at least 40 kDa.
9. An isolated antibody or fragment thereof that binds immunologically to *Bacillus anthracis* protective antigen and comprises the variable light and variable heavy chain of SEQ ID NO:21, with the exception that the variable light and variable heavy chain collectively comprise at least three modifications selected from the group consisting of: I21V, S22G, L33S, Q38R,

L46F, Q55L, S56P, T74A, S76N, Q78L, L94P, S7P, K19R, S30N, T57S, K62R, K64E, T68I, and M80L; wherein said I21V, S22G, L33S, Q38R, L46F, Q55L, S56P, T74A, S76N, Q78L and L94P are in the variable light chain and wherein said S7P, K19R, S30N, T57S, K62R, K64E, T68I and M80L are in the variable heavy chain.

10. The isolated antibody or fragment thereof of claim 9, further defined as comprising at least five of said modifications.

11. The isolated antibody or fragment thereof of claim 9, further defined as comprising all of said modifications.

12. The isolated antibody or fragment thereof of claim 9, further defined as binding immunologically to *Bacillus anthracis* protective antigen with an affinity  $K_d$  of between about 140 pM and about 21 pM as determined by surface plasmon resonance.

13. The isolated antibody or fragment thereof of claim 9, further defined as comprising Q55L and S56P.

14. The isolated antibody or fragment thereof of claim 9, further defined as comprising the variable light chain of SEQ ID NO:22 or SEQ ID NO:24.

15. The isolated antibody or fragment thereof of claim 9, further defined as comprising the variable heavy chain of SEQ ID NO:22 or SEQ ID NO:24.

16. The isolated antibody or fragment thereof of claim 9, further defined as comprising the variable light and variable heavy chains of SEQ ID NO:22.

17. The isolated antibody or fragment thereof of claim 9, further defined as comprising the variable light and variable heavy chains of SEQ ID NO:24.

18. The isolated antibody or fragment thereof of claim 7, further defined as a scAb, Fab or SFv.
19. The isolated antibody or fragment thereof of claim 7, further defined as comprising an Fc domain of IgA, IgD, IgE, IgG or IgM.
20. The isolated antibody or fragment thereof of claim 7, further defined as a humanized antibody.
21. The isolated antibody or fragment thereof of claim 1, comprising an scFv fragment and antibody constant regions forming a monovalent antibody portion of at least 40 kDa.
22. An isolated nucleic acid encoding the antibody or fragment thereof of claim 9.
23. The isolated nucleic acid of claim 22, further defined as encoding the variable light chain of SEQ ID NO:23 or SEQ ID NO:25.
24. The isolated nucleic acid of claim 22, further defined as encoding the variable heavy chain of SEQ ID NO:23 or SEQ ID NO:25.
25. The isolated nucleic acid of claim 22, further defined as encoding the polypeptide of SEQ ID NO:23.
26. The isolated nucleic acid of claim 22, further defined as encoding the polypeptide of SEQ ID NO:25.